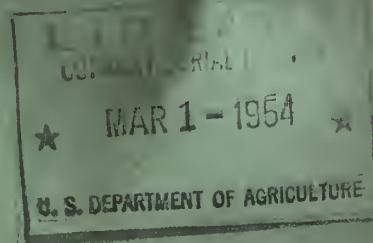


Historic, Archive Document

Do not assume content reflects current
scientific knowledge, policies, or practices.

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Federal - State Cooperative
Snow Surveys and Water Supply Forecasts
for
ARIZONA



SOIL CONSERVATION SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

Data included in this report were obtained by the agency named above in cooperation with the Federal, State and local organizations listed on the last page of this report.

AS OF
FEB. 15, 1954

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

TO RECIPIENTS OF COOPERATIVE SNOW SURVEY
AND WATER SUPPLY FORECAST REPORTS:

Forecasts by U. S. Weather Bureau of total annual streamflow October-September, inclusive, at more than 300 gaging stations are issued monthly January through May in the publication WATER SUPPLY FORECASTS FOR THE WESTERN UNITED STATES.

Weather Bureau forecasts of runoff presented in that bulletin are computed from procedures based on mathematical analysis of the relation between precipitation and runoff.

The Weather Bureau bulletins may be secured by writing to:

Hydrologist in Charge
River Forecast Center
U. S. Weather Bureau
712 Federal Office Building
Kansas City 6, Missouri

For current information on local river and flood conditions, reference should be made to the appropriate River District Office, listed below:

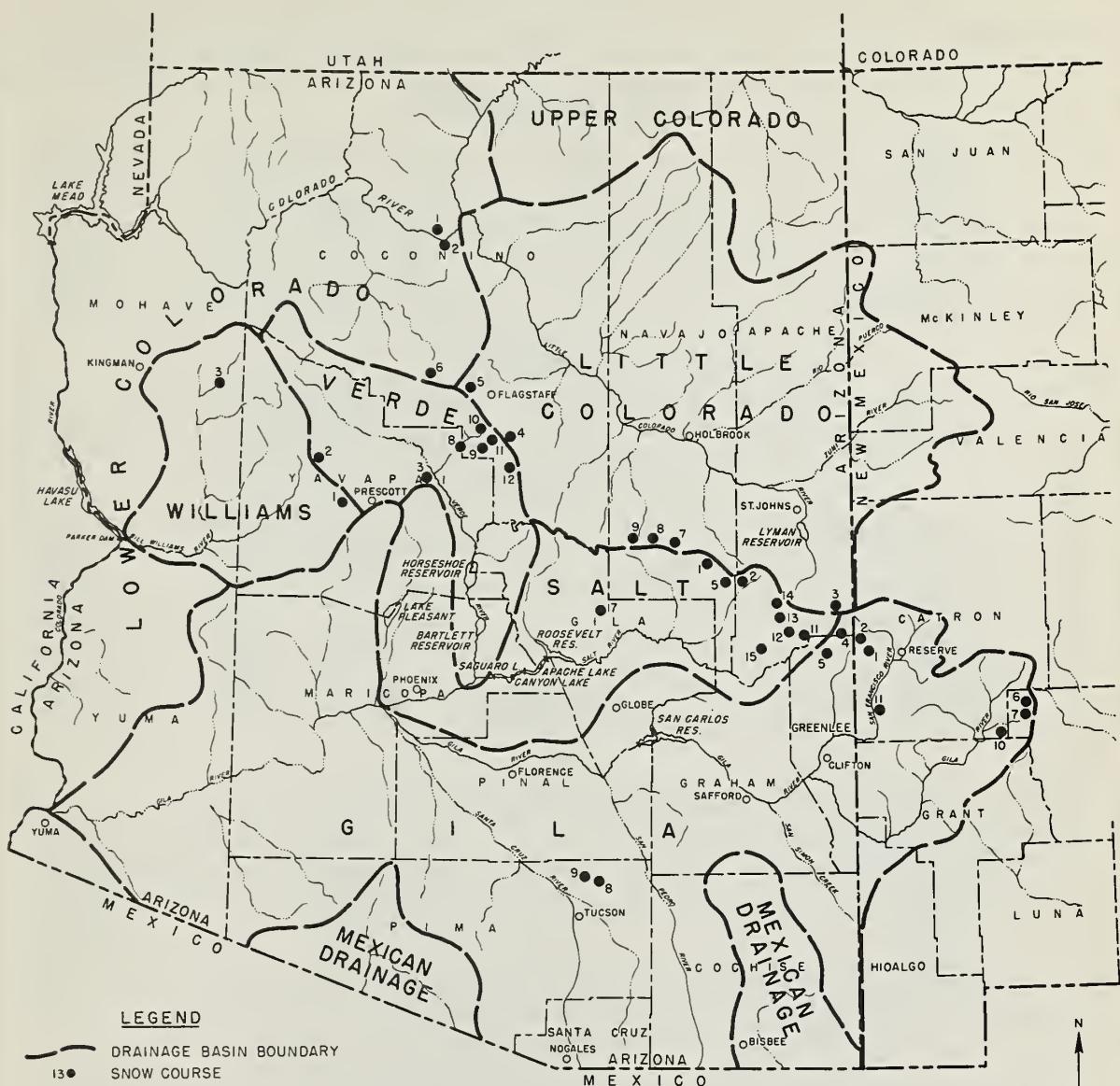
Meteorologist in Charge.....Colorado River and
Weather Bureau Airport Station tributaries in Arizona
3000 Sky Harbor Blvd., except San Juan
Phoenix, Arizona

State of Arizona

FEDERAL-STATE COOPERATIVE
SNOW SURVEYS AND IRRIGATION WATER FORECASTS
FOR
ARIZONA

Report Prepared
by
W. E. Anderson - Snow Survey Leader

Soil Conservation Service
39 North Sixth Avenue
Phoenix, Arizona



ARIZONA COOPERATIVE SNOW SURVEYS

SNOW COURSES AND DRAINAGE BASINS
JANUARY 1954

0 40 80 120 160 200
SCALE IN MILES

INDEX TO SNOW COURSES

NUMBER	NAME	SEC	TWP	RGE*	ELEVATION	
<u>LITTLE COLORADO RIVER</u>						
1. Forest Dale		2	9N	21E	6,000	
2. McNary		14	8N	23E	7,200	
3. Nutrioso		23	6N	30E	8,500	
4. Mormon Lake		13	18N	8E	7,350	
5. Fort Valley		22	22N	6E	7,350	
7. Gentry		36	11N	15E	7,600	
8. Heber		28	11N	15E	7,600	
9. Canyon Creek		18	11N	15E	7,500	
11. Mormon Mountain		14	18N	8E	7,500	
12. Happy Jack		30	17N	9E	7,630	
<u>WILLIAMS RIVER</u>						
1. Iron Springs		22	14N	3W	6,200	
2. Camp Wood		3	16N	6W	5,700	
3. Willow Ranch		16	21N	11W	5,000	
<u>GILA RIVER</u>						
1. Frisco Divide (N.M.)		31	65	20W **	8,000	
2. State Line (N.M.)		6	65	21W	8,000	
3. Nutrioso		23	6N	30E	8,500	
4. Coronado Trail		26	5N	30E	8,000	
5. Beaver Head		13	4N	30E	8,000	
6. Taylor Creek (N.M.)		20	10S	10W **	7,850	
7. Inman (N.M.)		6	11S	10W **	7,800	
8. Rose Canyon		15	12S	16E	7,300	
9. Bear Wallow		6	12S	16E	8,100	
10. Black Canyon (N.M.)		8	13S	11W **	6,790	
11. Mogollon (N.M.)		2	11S	19W **	7,000	
<u>VERDE RIVER</u>						
1. Iron Springs		22	14N	3W	6,200	
2. Camp Wood		3	16N	6W	5,700	
3. Mingus Mountain		3	15N	2E	7,100	
4. Mormon Lake		13	18N	8E	7,350	
5. Fort Valley		22	22N	6E	7,350	
6. Chalender		27	22N	3E	7,100	
8. Munds Park		7	18N	7E	6,500	
9. Casner Park		19	18N	8E	6,930	
10. Antelope Park					7,300	
11. Mormon Mountain		14	18N	8E	7,500	
12. Happy Jack		30	17N	9E	7,630	
<u>SALT RIVER</u>						
1. Forest Dale		2	9N	21E	6,000	
2. McNary		14	8N	23E	7,200	
3. Nutrioso		23	6N	30E	8,500	
4. Coronado Trail		26	5N	30E	8,000	
5. Milk Ranch		28	8N	23E	7,000	
7. Gentry		36	11N	15E	7,600	
8. Heber		28	11N	15E	7,600	
9. Canyon Creek		18	11N	15E	7,500	
11. Big Lake Knoll		3	5N	28E	8,800	
12. Maverick Ford		13	6N	27E	9,050	
13. Baldy		28	7N	27E	9,000	
14. Ft. Apache		18	7N	27E	9,160	
15. Pacheta		At Town of Maverick, Arizona				7,800
17. Workman Creek		33	6N	14E	6,900	
<u>LOWER COLORADO RIVER</u>						
1. Bright Angel		34	33N	3E	8,400	
2. Grand Canyon		21	30N	4E	7,500	
5. Fort Valley		22	22N	6E	7,350	
6. Chalender		27	22N	3E	7,100	

* All in Gila and Salt River Base and Meridian except where otherwise indicated.

** New Mexico Principal Meridian

WATER SUPPLY OUTLOOK

ARIZONA

February 15, 1954

* * * * * * * * * * * * * * * * *
* The storm of February 14 made little or no *
* improvement in the water supply prospects. *
* Slight increases in previous forecasts are *
* made for the Verde and Tonto drainages, but *
* the outlook for the Salt, Frisco and Gila *
* Rivers is still very poor. *
* * * * * * * * * * * * * * * * *

Snow Cover

Prior to the storm of February 14, most of the drainage areas were bare or had not over 20% snow cover except in the very highest elevations. Soil moisture conditions were much improved, but melting of the earlier snows had not resulted in runoff, having gone instead directly into the ground.

The February 14 storm deposited some snow in the Flagstaff vicinity, but generally made no improvement in other areas. Furthermore, the water content is low and most of the water resulting from melting of this snow will also go into the ground unless heavy rains should occur coupled with warm weather. Much additional snow will be required before substantial amounts of runoff can be anticipated, and storms of the necessary magnitude become less probable with each day's advance in the season. Long range weather forecasts are for approximately normal precipitation and possibly slightly below normal temperatures, indicating the possibility of further slight improvements. However, continuation of present weather conditions would result in early melting of the snow, but at such a rate that heavy runoff would not be obtained. Late season storms have occurred in past years and such a storm, if of sufficient magnitude, might make some slight improvements in the situation.

Stream Flow Forecasts

Present conditions indicate a runoff potential lower than any year since 1900 and possibly an all-time low. Warm weather and melting snow have caused a downward revision in some stream forecasts - an obvious error in the February 1 forecast for the San Francisco River, which should have been for 12,700 acre feet instead of 2,740 acre feet, has been corrected.

On the basis of conditions existing as of this date, the following forecasts of water supply for the period February through May, inclusive, 1954, are made:

River	At	February - May Inclusive Discharge Forecast Acre Feet	*Probable Limits of Deviation from Forecast	
			Minimum Acre Feet	Maximum Acre Feet
Salt	Intake	50,000	Base Flow	110,000
Tonto	Roosevelt	4,000	Base Flow	10,000
Verde	Horseshoe	48,000	Base Flow	74,000
Gila	Virden	12,000	Base Flow	18,000
Frisco	Clifton	9,000	Base Flow	17,000

*Representing limits of one standard error.

Users of these forecasts should note they are based on statistically determined regression lines established by correlation between runoff, snow water content, and precipitation factors. Since the period of record is comparatively short (i.e. 16 years maximum for Arizona snow courses) and includes several years of unusual conditions, such as 1941, the distributional errors of sampling may well be rather large. The resulting spread between forecast and actual conditions will narrow progressively as the period of record becomes longer with consequent improvements in correlations and decrease in relative importance of the effect of the years of extreme variability.

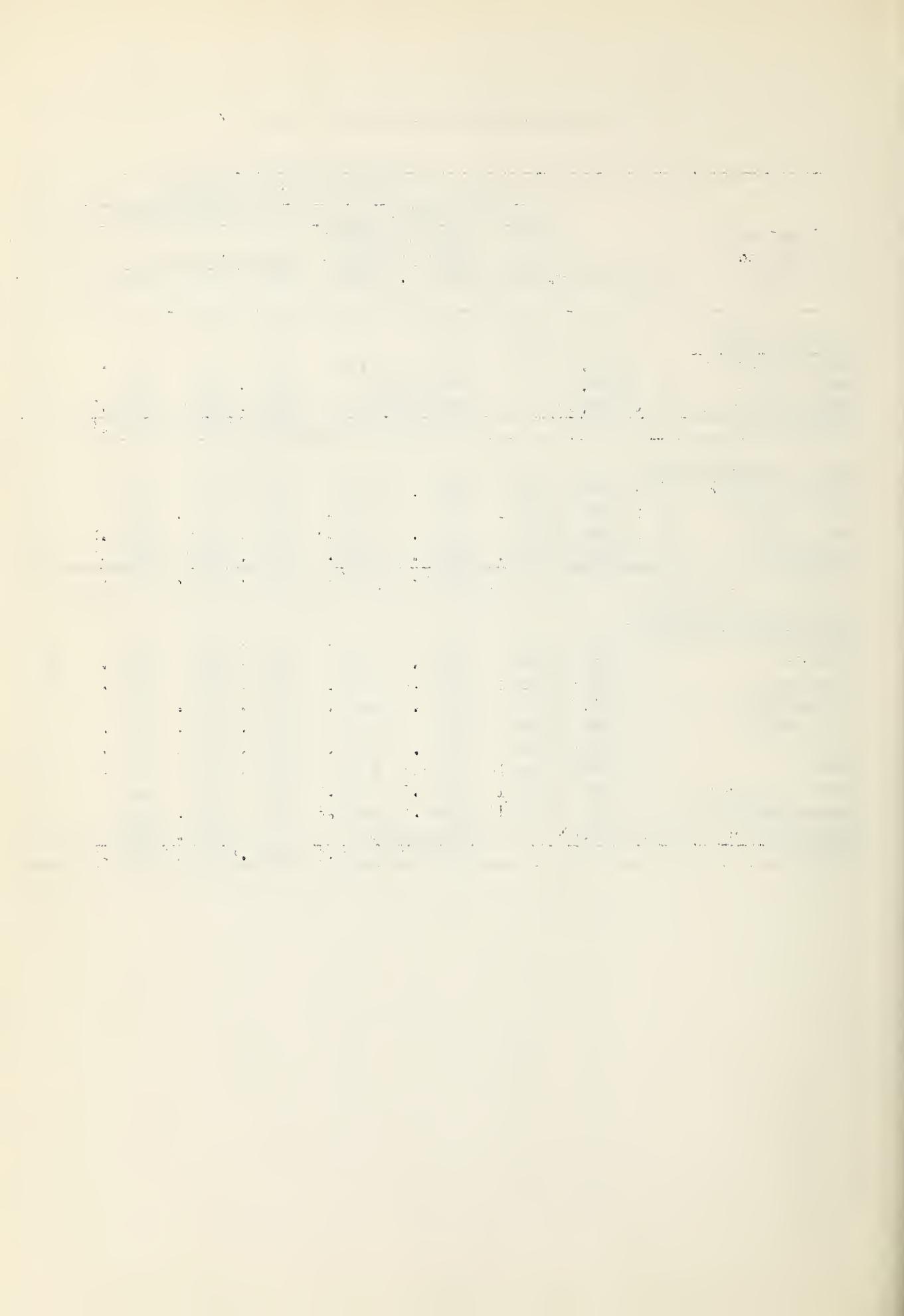
ARIZONA SNOW SURVEYS FEBRUARY 15, 1954

DRAINAGE BASIN and SNOW COURSE		No.	Elev.	SNOW COVER MEASUREMENTS					Years of Record
				Date of Survey	Snow Depth (In.)	Water Content (In.)	Water Content (In.)	1953	1952
GILA RIVER									
Frisco Divide	1	8,000	2/15	2.2	0.4	0.8	0.7	2.0	14
State Line	2	8,000	2/15	2.8	0.4	0.4	1.4	2.7	14
Nutrioso	3	8,500	2/15	2.8	0.2	0.3	2.4	2.4	14
Coronado Trail	4	8,000	2/15	1.7	0.2	0.3	5.8	3.6	14
Beaver Head	5	8,000	2/15	4.3	0.3	1.3	4.3	3.2	13
Taylor Creek	6	7,850		No Report		0.0	-	0.7	10
Inman	7	7,800		No Report		0.0	0.0	0.8	7
Rose Canyon	8	7,300	2/16	3.7*	0.7*	0.0*	0.0*	1.1*	6
Bear Wallow	9	8,100	2/16	7.8*	1.9*	0.0*	0.0*	2.1*	6
Black Canyon	10	6,790	2/15	4.0	0.4	0.3	-	0.3	1
Mogollon	11	7,000	2/15	4.4	0.8	1.8	-	1.8	1
Average				3.2	0.4	0.6	2.4	1.9	
SALT RIVER									
Forest Dale	1	7,000	2/15	0.0	0.0	0.0	0.9	0.9	14
McNary	2	7,200	2/15	7.5	2.9	0.6	1.3	2.5	14
Nutrioso	3	8,500	2/15	2.8	0.2	0.3	2.4	2.4	14
Coronado Trail	4	8,000	2/15	1.7	0.2	0.3	5.8	3.6	14
Beaver Head	5	8,000	2/15	4.3	0.3	1.3	4.3	3.2	13
Milk Ranch	5	7,000	2/14	0.0	0.0	0.1	1.0	1.3	13
Gentry	7	7,600	2/16	9.4	2.0	0.4	5.2	2.3	4
Heber	8	7,600	2/16	8.3	1.8	0.9	5.4	2.4	4
Canyon Creek	9	7,500	2/16	12.1	2.2	0.9	7.8	3.3	4
Maverick Fork	12	9,020	2/17	16.6	5.0	4.2	16.2	7.6	4
Baldy	13	9,125	2/17	18.9	4.9	5.3	13.0	6.3	4
Ft. Apache	14	9,160	2/17	23.1	5.3	6.3	13.2	6.5	4
Pacheta	15	7,800	2/15	3.2	0.5	-	6.4	2.1	3
Workman Creek	17	6,900		No Report		5.7	1.2	3.5	2
Average				8.3	1.9	2.0	6.0	3.4	
VERDE RIVER									
Iron Springs	1	6,200	2/12	0.0	0.0	0.0	T	1.7	8
Camp Wood	2	5,700		No Report		0.0	0.0	1.1	8
Mingus Mountain	3	7,100	2/15	8.9	1.2	0.0	0.6	1.7	7
Mormon Lake	4	7,350	2/15	20.6	3.0	1.5	6.7	6.1	7
Fort Valley	5	7,350	2/15	14.6	1.8	1.0	6.8	3.2	7
Chalender	6	7,100	2/15	14.9	2.6	1.1	6.6	3.7	7
Munds Park	8	6,500	2/15	15.0	2.4	-	T	0.0	3
Casner Park	9	6,930	2/15	17.2	2.3	T	6.4	2.9	4
Mormon Mountain	11	7,500	2/15	20.8	3.8	2.9	9.2	4.6	4
Happy Jack	12	7,630		No Report		T	7.7	2.6	3
Gaddes Canyon	13	7,600	2/15	21.6	2.6	-	-	-	0
Average				14.8	2.2	0.7	4.4	2.8	

*Not included in averages

ARIZONA SNOW SURVEYS FEBRUARY 15, 1954

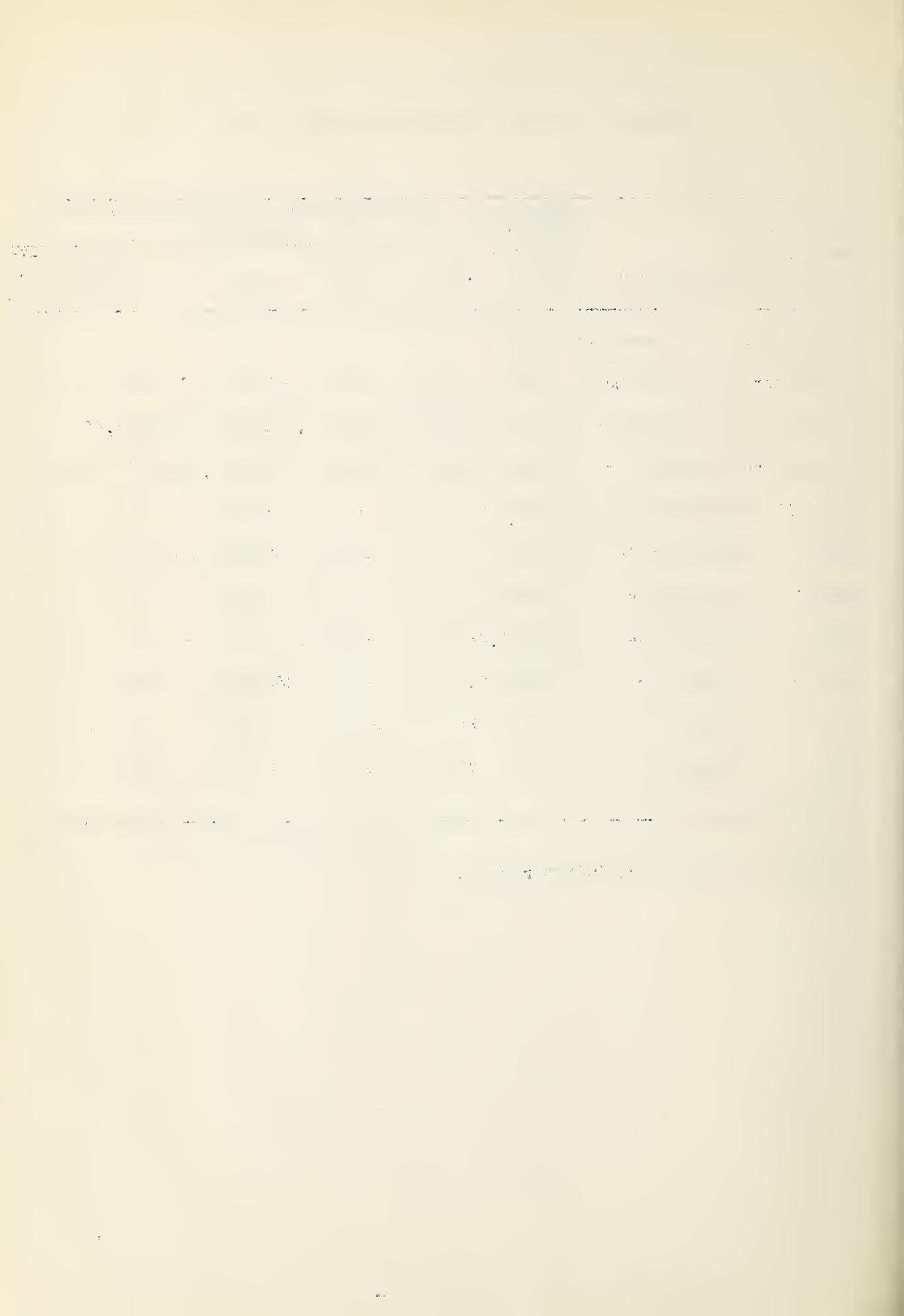
DRAINAGE BASIN and SNOW COURSE		No.	Elev.	SNOW COVER MEASUREMENT					Years of Record
				Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record		
					1954	1953	1952	Average	
WILLIAMS RIVER									
Iron Springs	1	6,200	2/12	0.0	0.0	0.0	T	1.7	8
Camp Wood	2	5,700		No Report		0.0	0.0	1.1	8
Willow Ranch	3	5,000		No Report		0.0	0.0	0.7	7
Average				0.0	0.0	0.0	0.0	1.2	
LOWER COLORADO RIVER									
Bright Angel	1	8,400	2/15	26.5	4.4	6.3	14.8	8.7	7
Grand Canyon	2	7,500	2/15	7.3	1.5	0.4	2.7	3.0	6
Fort Valley	5	7,350	2/15	14.6	1.8	1.0	6.8	3.2	7
Chalender	6	7,100	2/15	14.9	2.6	1.1	6.6	3.7	7
Average				15.8	2.6	2.2	7.7	4.6	
LITTLE COLORADO RIVER									
Forest Dale	1	7,000	2/15	0.0	0.0	0.0	0.9	0.9	14
McNary	2	7,200	2/14	7.5	2.9	0.6	1.3	2.5	14
Nutrioso	3	8,500	2/15	2.8	0.2	0.3	2.4	2.4	14
Mormon Lake	4	7,350	2/15	20.6	3.0	1.5	6.7	6.1	7
Fort Valley	5	7,350	2/15	14.6	1.8	1.0	6.8	3.2	7
Gentry	7	7,600	2/16	9.4	2.0	0.4	5.2	2.3	4
Heber	8	7,600	2/16	8.3	1.8	0.9	5.4	2.4	4
Canyon Creek	9	7,500	2/16	12.1	2.2	0.9	7.8	3.3	4
Mormon Mountain	11	7,500	2/15	20.8	3.8	2.9	9.2	4.6	4
Happy Jack	12	7,630		No Report		T	7.7	2.6	3
Average				10.6	2.0	0.8	5.3	3.0	



STATUS OF RESERVOIR STORAGE FEBRUARY 15, 1954

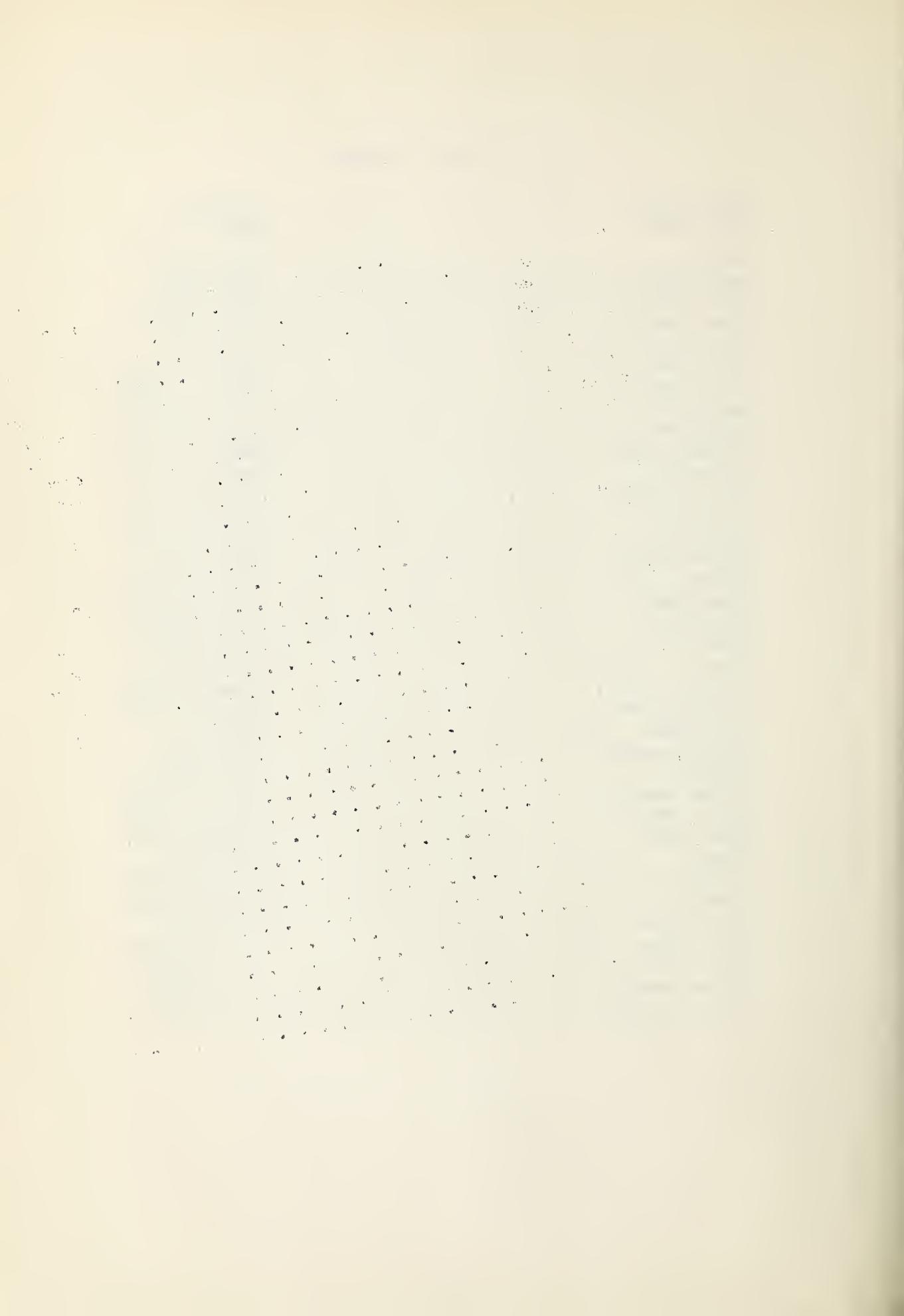
BASIN and STREAM	RESERVOIR	USABLE CAPACITY (Thous. A.F.)	THOUSAND ACRE FEET IN STORAGE ABOUT FEBRUARY 15				10-Year 1951 Average 1942-1951
			1954	1953	1952		
Agua Fria	Lake Pleasant	178	33	82	119	0	13
Colorado	Lake Havasu	688	603	588	611	619	570
Colorado	Lake Mohave	1,810	1,664	1,574	1,593	1,402	-
Colorado	Lake Mead	27,935	16,441	18,800	17,006	17,434	19,282
Gila	San Carlos	1,285	0	6	152	0	204
Verde	Bartlett	180	42	32	176	9	33
Verde	Horseshoe	143	5	1	45	1	9*
Salt	Roosevelt	1,382	586	1,027	494	4	487
Salt	Apache	245	244	235	186	168	200
Salt	Canyon	58	57	54	43	50	30
Salt	Saguaro	70	49	43	44	48	21

*Average for years 1946 through 1951



LIST OF SNOW SURVEYORS

<u>SNOW COURSE</u>	<u>SURVEYOR</u>
Baldy	SCS and SRVWU
Bear Wallow	Wm. Hughes
Beaver Head	Jess Burke
Black Canyon	E. Van Winkle
Bright Angel	Valentine
Camp Wood	Mrs. C. C. Merritt
Canyon Creek	SCS and SRVWU
Casner Park	SCS and SRVWU
Chalender	V. J. Schroeder
Coronado Trail	Frank Casanova
Forest Dale	Wm. Fair
Frisco Divide	J. B. Shumate
Ft. Apache	SCS and SRVWU
Fort Valley	A. P. Loska
Gaddes Canyon	Richard Enz
Gentry	SCS and SRVWU
Grand Canyon	C. E. Lehnert
Happy Jack	Emil Ryberg
Heber	SCS and SRVWU
Inman	F. M. Inman
Iron Springs	Ernest Saxby
Maverick Fork	SCS and SRVWU
Milk Ranch	Wm. Fair
Mingus Mountain	Richard Enz
Mogollon	J. R. Wray
Mormon Lake	SCS and SRVWU
Mormon Mountain	SCS and SRVWU
Munds Park	SCS and SRVWU
McNary	Wm. Fair
Nutrioso	Frank Casanova
Pacheta	Foch Phillips
Rose Canyon	Wm. Hughes
State Line	J. B. Shumate
Taylor Creek	F. M. Inman
Willow Ranch	L. W. Miller
Workman Creek	C. L. Moore



The following organizations cooperate in the Arizona snow survey work:

FEDERAL

Department of Agriculture

Forest Service

Apache Forest

Coconino Forest

Coronado Forest

Gila Forest

Kaibab Forest

Prescott Forest

Sitgreaves Forest

Southwestern Forest and Range Experiment

Station, Fort Valley, Arizona

Sierra Ancha Forest Experiment Station

Soil Conservation Service

Department of Commerce

Weather Bureau

Arizona Section

Department of Interior

Bureau of Reclamation

Region III

Geological Survey

Arizona District

Bureau of Indian Affairs

Fort Apache Reservation

National Park Service

Grand Canyon National Park

Gila Water Commissioner, Safford, Arizona

IRRIGATION PROJECTS

Salt River Valley Water Users' Association,
Phoenix, Arizona

San Carlos Irrigation and Drainage District,
Coolidge, Arizona

SOUTHWEST LUMBER MILLS, INC., McNary, Arizona

Other organizations and individuals furnish valuable information for the snow survey reports. Their co-operation is gratefully acknowledged.



Federal - State - Private

COOPERATIVE SNOW SURVEYS

—
Furnishes the basic data
necessary for forecasting
water supply for irrigation,
domestic and municipal water
supply, hydro-electric power
generation, navigation,
mining and industry

—

"WATER IS THE WEST'S GREATEST RESOURCE"